

## CLAIMS OF THE INVENTION

WE CLAIM:

1. A method for modifying a packet comprising:  
providing a portion of a packet to a data selector;  
5 providing a control word to the switch;  
providing control instructions to the data selector, the control instructions  
containing data regarding operation of the data selector; and  
outputting data from the data selector comprising a portion of the packet or a  
portion of the control word.

10 2. The method of Claim 1, wherein the data selector output comprises a modified  
packet.

3. The method of Claim 1, further including providing a label to the data selector,  
15 and wherein outputting data from the data selector comprises a portion of the packet  
or a portion of the label.

4. The method of Claim 1, wherein the control word is stored in a control word  
bank.

20 5. The method of Claim 1, wherein the control instructions comprise microcode.

6. The method of Claim 1, wherein the portion of a packet is stored in a register.

7. The method of Claim 1, wherein the data selector comprises a multiplexer.

5 8. A method for dynamically modifying a packet using a pipeline processing system

comprising:

storing a portion of the packet in a register, the register accessible by a multiplexer;

10 storing supplemental data in a memory, the supplemental data accessible by the multiplexer;

clocking data from the portion of the packet and the supplemental data into the multiplexer; and

controlling the multiplexer with control instructions to selectively output a  
15 portion of the portion of the packet and/or a portion of the supplemental data to generate a dynamically modified packet.

9. The method of Claim 8, wherein the control instructions comprise microcode that is generated by a user of the pipeline processing system.

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10. The method of Claim 8, further including analyzing an output from a progress counter to determine multiplexer output.

11. The method of Claim 8, wherein the supplemental data comprises a control  
5 word and the memory comprises a control word bank.

12. The method of Claim 8, wherein the supplemental data comprises label data.

10 13. The method of Claim 8, wherein the portion of the packet comprises four bytes.

14. The method of Claim 8, wherein the pipeline processing system includes two or more stages and further including generating control data at each stage to distribute  
15 control operations at two or more stages.

15. A method for adding a tag to a packet comprising:

identifying a control word to guide processing of a packet, the control word being associated with a packet and containing tag data;

20 storing a portion of a packet in a memory; and

selectively outputting, based on the control word, either of a portion of the packet or a portion of tag data to generate the packet with a tag attached.

16. The method of Claim 15, further including the step of accessing an output of  
5 a byte counter to determine the location at which to insert tag data.

17. The method of Claim 15, further including the step of accessing label data to obtain additional tag data.

10 18. The method of Claim 15, wherein the memory comprises a register.

19. The method of Claim 15, wherein the method occurs in a pipeline processing system configured to pass an entire packet through the pipeline processing system and selectively add a tag to the packet.

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20. The method of Claim 19, wherein the method is further configured to replace portions of the packet with tag data as the packet passes through the pipeline processing system.

20 21. The method of Claim 19, wherein the control word includes control store instructions.

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22. A system for dynamically modifying or supplementing the contents of a packet on a packet by packet basis comprising:

a first memory configured to store a control word;

5 a second memory configured to store a portion of a packet;

a third memory configured to store data selector control instructions;

a data selector in communication with the first, second, and third memories and configured to output data from the first memory or data from the second memory based on the data selector control instruction from the third memory.

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23. The system of Claim 22, wherein the second memory comprises a register.

24. The system of Claim 22, wherein the data selector comprises a multiplexer.

15 25. The system of Claim 22, further including a data counter having an output connected to the data selector and controlling when the data selector should output data from the first memory.

26. The system of Claim 22, further including a forth memory configured to  
20 store additional data for use in modifying or supplementing the contents of the packet when the control word does not contain the desired data.

27. The system of Claim 22, wherein the data selector control instructions comprise microcode.

5 28. A system for modifying a packet based on control instructions, the system comprising:

a pipeline processing stage comprising:

one or more memory modules configured to store packet data and supplemental data;

10 a processing module configured to:

add supplemental data to a packet;

strip data from a packet;

based on control instructions and a processing location in the packet;

and,

15 a control system comprising:

a packet location tracking system configured to track the current processing location in the packet;

a memory bank configured to store control instructions.

20 29. The system of Claim 28, wherein the processing module is further configured to modify data in a packet or decrement a byte of data in a packet.

30. A system of Claim 28, further including an interface configured to interface the pipeline processing stage with the control system.

5 31. A system of Claim 28, wherein add supplemental data, strip data, and replace data may occur at any location in a packet.

32. A system of Claim 28, wherein the packet location tracking system comprises a counter.

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33. A system of Claim 28, further including an end of packet monitoring system configured to detect the end of a packet, the end of packet monitoring system configured to reset the packet location tracking system.

15 34. A system of Claim 28, further including a control instruction selecting systems configured to identify which of a plurality of control instructions are for use by the pipeline processing stage.

35. A system of Claim 34, wherein the control instruction selecting systems  
20 comprises a packet counter configured to provide an output to the processing stage

indicating a location in the memory bank at which the control instructions for the packet are located.

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